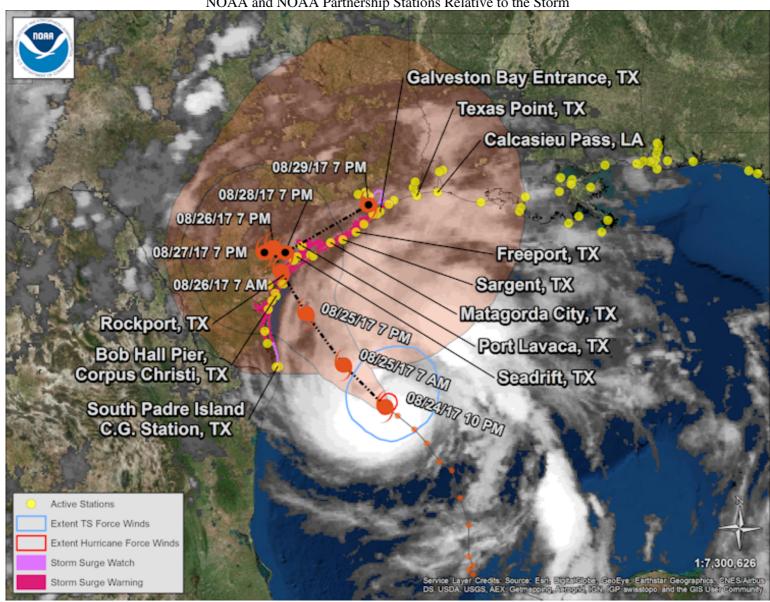




Hurricane HARVEY QuickLook Posted: 23:00 CDT 08/24/2017

NOAA and NOAA Partnership Stations Relative to the Storm



### Storm Analysis

As of 8/24/2017 2300 CDT, water levels along the Texas coastline continue to measure slightly above normal tide levels and range between 0.4 and 1.2 feet above tide predictions. Winds are also slowly increasing from Sargent to the Texas-Louisiana border with gusts over 25 knots measured over the past few hours. Barometric pressure is gradually falling across the region.

Water (MHHW) is displayed to provide an approximate indication of when flooding inundation may occur. For additional data, please see the Center for Operational Oceanographic Products & Services website. For more information or archived products and reports, please see the Storm OuickLook Homepage. Analyst: AC SELECT NATIONAL HURRICANE CENTER ADVISORY INFORMATION: HURRICANE HARVEY ADVISORY NUMBER 19 NWS NATIONAL HURRICANE CENTER MIAMI FL 1000 PM CDT THU AUG 24 2017 ...HARVEY EXPECTED TO STRENGTHEN AS IT MOVES TOWARDS THE TEXAS COAST... ...LIFE-THREATENING AND DEVASTATING FLOODING EXPECTED NEAR THE COAST DUE TO HEAVY RAINFALL AND STORM SURGE... SUMMARY OF 1000 PM CDT...0300 UTC...INFORMATION LOCATION...25.2N 94.6W ABOUT 250 MI...400 KM SE OF CORPUS CHRISTI TEXAS ABOUT 245 MI...400 KM SSE OF PORT OCONNOR TEXAS MAXIMUM SUSTAINED WINDS...85 MPH...140 KM/H PRESENT MOVEMENT...NW OR 315 DEGREES AT 10 MPH...17 KM/H MINIMUM CENTRAL PRESSURE...973 MB...28.74 INCHES WATCHES AND WARNINGS CHANGES WITH THIS ADVISORY: NONE. SUMMARY OF WATCHES AND WARNINGS IN EFFECT:

A STORM SURGE WARNING IS IN EFFECT FOR...

Water Level and Meteorological plots available below are updated automatically. A line denoting Mean Higher High

- \* PORT MANSFIELD TO HIGH ISLAND TEXAS
- A STORM SURGE WATCH IS IN EFFECT FOR...
- \* SOUTH OF PORT MANSFIELD TEXAS TO THE MOUTH OF THE RIO GRANDE
- A HURRICANE WARNING IS IN EFFECT FOR...
- \* PORT MANSFIELD TO SARGENT TEXAS
- A TROPICAL STORM WARNING IS IN EFFECT FOR...
- \* NORTH OF SARGENT TO HIGH ISLAND TEXAS
- \* SOUTH OF PORT MANSFIELD TEXAS TO THE MOUTH OF THE RIO GRANDE
- A HURRICANE WATCH IS IN EFFECT FOR...
- \* SOUTH OF PORT MANSFIELD TEXAS TO THE MOUTH OF THE RIO GRANDE
- A TROPICAL STORM WATCH IS IN EFFECT FOR...
- \* SOUTH OF THE MOUTH OF THE RIO GRANDE TO BOCA DE CATAN MEXICO

A STORM SURGE WARNING MEANS THERE IS A DANGER OF LIFE-THREATENING INUNDATION, FROM RISING WATER MOVING INLAND FROM THE COASTLINE, DURING THE NEXT 36 HOURS IN THE INDICATED LOCATIONS. FOR A DEPICTION OF AREAS AT RISK, PLEASE SEE THE NATIONAL WEATHER SERVICE STORM SURGE WATCH/WARNING GRAPHIC, AVAILABLE AT HURRICANES.GOV. THIS IS A LIFE-THREATENING SITUATION. PERSONS LOCATED WITHIN THESE AREAS SHOULD TAKE ALL NECESSARY ACTIONS TO PROTECT LIFE AND PROPERTY FROM RISING WATER AND THE POTENTIAL FOR OTHER DANGEROUS CONDITIONS. PROMPTLY FOLLOW EVACUATION AND OTHER INSTRUCTIONS FROM LOCAL OFFICIALS.

A HURRICANE WARNING MEANS THAT HURRICANE CONDITIONS ARE EXPECTED SOMEWHERE WITHIN THE WARNING AREA. A WARNING IS TYPICALLY ISSUED 36 HOURS BEFORE THE ANTICIPATED FIRST OCCURRENCE OF TROPICAL-STORM- FORCE WINDS, CONDITIONS THAT MAKE OUTSIDE PREPARATIONS DIFFICULT OR DANGEROUS. PREPARATIONS TO PROTECT LIFE AND PROPERTY SHOULD BE RUSHED TO COMPLETION.

A STORM SURGE WATCH MEANS THERE IS A POSSIBILITY OF LIFE- THREATENING INUNDATION, FROM RISING WATER MOVING INLAND FROM THE COASTLINE, IN THE INDICATED LOCATIONS DURING THE NEXT 48 HOURS.

A HURRICANE WATCH MEANS THAT HURRICANE CONDITIONS ARE POSSIBLE WITHIN THE WATCH AREA.

IN ADDITION, INTERESTS IN SOUTHWESTERN LOUISIANA SHOULD CONTINUE TO MONITOR THE PROGRESS OF THIS SYSTEM.

FOR STORM INFORMATION SPECIFIC TO YOUR AREA IN THE UNITED STATES, INCLUDING POSSIBLE INLAND WATCHES AND WARNINGS, PLEASE MONITOR PRODUCTS ISSUED BY YOUR

LOCAL NATIONAL WEATHER SERVICE FORECAST OFFICE. FOR STORM INFORMATION SPECIFIC TO YOUR AREA OUTSIDE THE UNITED STATES, PLEASE MONITOR PRODUCTS ISSUED BY YOUR NATIONAL METEOROLOGICAL SERVICE.

DISCUSSION AND 48-HOUR OUTLOOK

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AT 1000 PM CDT (0300 UTC), THE CENTER OF HURRICANE HARVEY WAS LOCATED NEAR LATITUDE 25.2 NORTH, LONGITUDE 94.6 WEST. HARVEY IS MOVING TOWARD THE NORTHWEST NEAR 10 MPH (17 KM/H). THIS GENERAL MOTION IS EXPECTED TO CONTINUE WITH A DECREASE IN FORWARD SPEED DURING THE NEXT COUPLE OF DAYS. ON THE FORECAST TRACK, HARVEY WILL APPROACH THE MIDDLE TEXAS COAST ON FRIDAY AND MAKE LANDFALL FRIDAY NIGHT OR EARLY SATURDAY. HARVEY IS THEN LIKELY TO STALL NEAR OR JUST INLAND OF THE MIDDLE TEXAS COAST THROUGH THE WEEKEND.

REPORTS FROM AN AIR FORCE RESERVE HURRICANE HUNTER AIRCRAFT INDICATE THAT MAXIMUM SUSTAINED WINDS REMAIN NEAR 85 MPH (140 KM/H) WITH HIGHER GUSTS. WHILE HARVEY HAS CHANGED LITTLE IN STRENGTH OVER THE PAST SEVERAL HOURS, STRENGTHENING IS EXPECTED TO RESUME LATER TONIGHT, AND HARVEY IS EXPECTED TO BECOME A MAJOR HURRICANE BY FRIDAY BEFORE IT REACHES THE MIDDLE TEXAS COAST.

HURRICANE-FORCE WINDS EXTEND OUTWARD UP TO 25 MILES (35 KM) FROM THE CENTER AND TROPICAL-STORM-FORCE WINDS EXTEND OUTWARD UP TO 105 MILES (165 KM).

THE LATEST MINIMUM CENTRAL PRESSURE REPORTED BY THE HURRICANE HUNTER AIRCRAFT IS 973 MB (28.74 INCHES).

HAZARDS AFFECTING LAND

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RAINFALL: HARVEY IS EXPECTED TO PRODUCE TOTAL RAIN ACCUMULATIONS OF 15 TO 25 INCHES AND ISOLATED MAXIMUM AMOUNTS OF 35 INCHES OVER THE MIDDLE AND UPPER TEXAS COAST THROUGH NEXT WEDNESDAY. DURING THE SAME TIME PERIOD HARVEY IS EXPECTED TO PRODUCE TOTAL RAIN ACCUMULATIONS OF 7 TO 15 INCHES IN FAR SOUTH TEXAS AND THE TEXAS HILL COUNTRY EASTWARD THROUGH CENTRAL AND SOUTHWEST LOUISIANA, WITH ACCUMULATIONS OF UP TO 7 INCHES EXTENDING INTO OTHER PARTS OF TEXAS AND THE LOWER MISSISSIPPI VALLEY. RAINFALL FROM HARVEY WILL CAUSE DEVASTATING AND LIFE-THREATENING FLOODING.

STORM SURGE: THE COMBINATION OF A DANGEROUS STORM SURGE AND THE TIDE WILL CAUSE NORMALLY DRY AREAS NEAR THE COAST TO BE FLOODED BY RISING WATERS MOVING INLAND FROM THE SHORELINE. THE WATER IS EXPECTED TO REACH THE FOLLOWING HEIGHTS ABOVE GROUND IF THE PEAK SURGE OCCURS AT THE TIME OF HIGH TIDE...

N ENTRANCE PADRE ISLAND NATL SEASHORE TO SARGENT...6 TO 12 FT

SARGENT TO JAMAICA BEACH...5 TO 8 FT

PORT MANSFIELD TO N ENTRANCE PADRE ISLAND NATL SEASHORE...5 TO 7 FT

JAMAICA BEACH TO HIGH ISLAND...2 TO 4 FT

MOUTH OF THE RIO GRANDE TO PORT MANSFIELD...2 TO 4 FT

HIGH ISLAND TO MORGAN CITY...1 TO 3 FT

THE DEEPEST WATER WILL OCCUR ALONG THE IMMEDIATE COAST NEAR AND TO THE NORTHEAST OF THE LANDFALL LOCATION, WHERE THE SURGE WILL BE ACCOMPANIED BY LARGE AND DESTRUCTIVE WAVES. SURGE-RELATED FLOODING DEPENDS ON THE RELATIVE TIMING OF THE SURGE AND THE TIDAL CYCLE, AND CAN VARY GREATLY OVER SHORT DISTANCES. FOR INFORMATION SPECIFIC TO YOUR AREA, PLEASE SEE PRODUCTS ISSUED BY YOUR LOCAL NATIONAL WEATHER SERVICE FORECAST OFFICE.

WIND: HURRICANE CONDITIONS ARE LIKELY WITHIN THE HURRICANE WARNING AREA LATE FRIDAY AND FRIDAY NIGHT, WITH TROPICAL STORM CONDITIONS EXPECTED TO FIRST REACH THE COAST IN THE HURRICANE WARNING AREA FRIDAY. THESE CONDITIONS ARE LIKELY TO PERSIST INTO SATURDAY IN PORTIONS OF THE HURRICANE AND TROPICAL STORM WARNING AREA.

SURF: SWELLS GENERATED BY HARVEY ARE LIKELY TO AFFECT THE TEXAS, LOUISIANA, AND NORTHEAST MEXICO COASTS BY FRIDAY. THESE SWELLS ARE LIKELY TO CAUSE LIFE-THREATENING SURF AND RIP CURRENT CONDITIONS. PLEASE CONSULT PRODUCTS FROM YOUR LOCAL WEATHER OFFICE.

TORNADOES: ISOLATED TORNADOES ARE POSSIBLE ACROSS PORTIONS OF THE MIDDLE AND UPPER TEXAS COAST ON FRIDAY.

NEXT ADVISORY

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NEXT INTERMEDIATE ADVISORIES AT 1200 AM CDT AND 200 AM CDT.

NEXT COMPLETE ADVISORY AT 400 AM CDT.

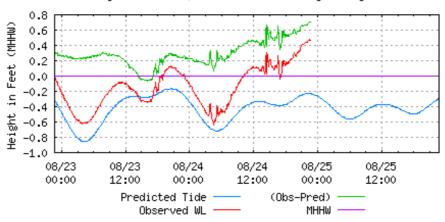
FORECASTER BEVEN

For the purpose of timely release, data contained within this QuickLook have undergone a "limited" NOS Quality Assurance/Control; however, the data have not yet undergone final verification. All data subject to NOS verification.

Jump to: Port Lavaca - Water Level, Port Lavaca - Winds, Port Lavaca - Barometric, Matagorda City - Water Level, Matagorda City - Winds, Sargent - Water Level, Sargent - Winds, Sargent - Barometric, Freeport - Water Level, Freeport - Water Level, Galveston Bay Entrance, North Jetty - Water Level, Galveston Bay Entrance, North Jetty - Winds, Texas Point, Sabine Pass - Water Level, Texas Point, Sabine Pass - Winds, Calcasieu Pass - Water Level, Calcasieu Pass - Winds, Seadrift - Water Level, Seadrift - Winds, Rockport - Water Level, Rockport - Winds, Rockport - Barometric, Bob Hall Pier, Corpus Christi - Water Level, Bob Hall Pier, Corpus Christi - Winds, South Padre Island CG Station - Winds

### NOAA/NOS/CO-OPS 8773259 Port Lavaca, TX

Preliminary Water Level, relative to Mean Higher High Water(MHHW)



Last Observed Sample: 08/24/2017 22:42 (CDT). Data relative to MHHW Observed: 0.46 ft. Predicted: -0.23 ft. Residual: 0.69 ft.

Historical Maximum Water Level: n/a Next High Tide: 08/25/2017 12:11 (CDT), -0.37 ft.

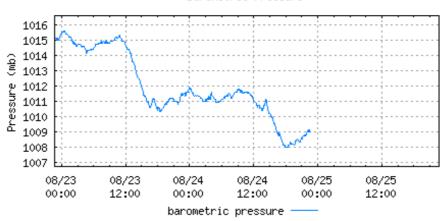
### NOAA/NOS/CO-OPS 8773259 Port Lavaca, TX

Wind Speed / Gusts / Direction 360 35 30 270 direction (true) speed (knots) 25 20 180 15 10 90 5 Ô 0 08/23 08/23 08/24 08/24 08/25 08/25 00:00 12:00 00:00 12:00 00:00 12:00 speed direction gusts

Last Observed Sample: 08/24/2017 22:42 (CDT) Wind Speed: 10 knots Gusts: 12 knots Direction: 44° T

### NOAA/NOS/CO-OPS 8773259 Port Lavaca, TX

#### Barometric Pressure



Last Observed Sample: 08/24/2017 22:42 (CDT)

Barometric Pressure: 1009.1 mb

### NOAA/NOS/CO-OPS 8773146 Matagorda City, TX

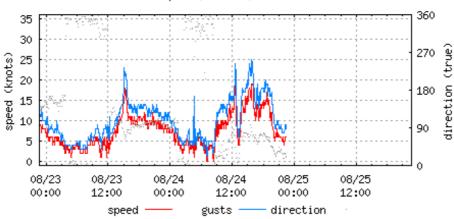
Preliminary Water Level, relative to Mean Higher High Water(MHHW) 0.8 Height in Feet (MHHW) 0.6 0.4 0.2 0.0 -0.2 -0.4 08/23 08/23 08/24 08/24 08/25 08/25 00:00 12:00 12:00 00:00 12:00 00:00 Predicted Tide (Obs-Pred) Observed WL MHHW

Last Observed Sample: 08/24/2017 22:36 (CDT). Data relative to MHHW Observed: 0.39 ft. Predicted: -0.18 ft. Residual: 0.57 ft.

Historical Maximum Water Level: n/a Next High Tide: 08/25/2017 07:29 (CDT), -0.13 ft.

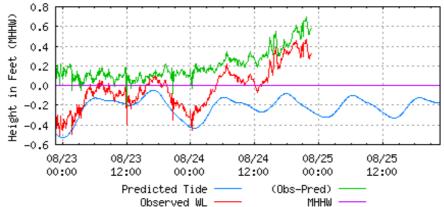
### NOAA/NOS/CO-OPS 8773146 Matagorda City, TX

Wind Speed / Gusts / Direction



Last Observed Sample: 08/24/2017 22:36 (CDT) Wind Speed: 6 knots Gusts: 9 knots Direction: 16° T

### NOAA/NOS/CO-OPS 8772985 Sargent, TX

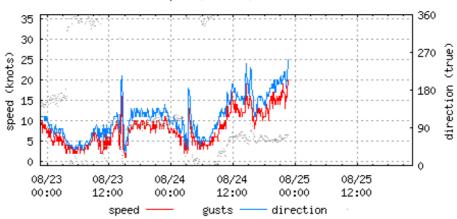


Last Observed Sample: 08/24/2017 22:36 (CDT). Data relative to MHHW Observed: 0.32 ft. Predicted: -0.26 ft. Residual: 0.58 ft.

Historical Maximum Water Level: n/a Next High Tide: 08/25/2017 06:21 (CDT), -0.10 ft.

# NOAA/NOS/CO-OPS 8772985 Sargent, TX

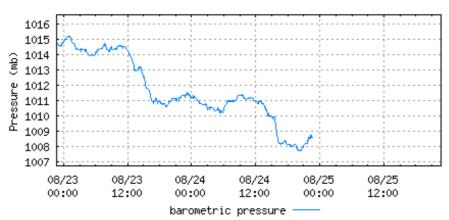
Wind Speed / Gusts / Direction



Last Observed Sample: 08/24/2017 22:36 (CDT) Wind Speed: 20 knots Gusts: 25 knots Direction: 73° T

## NOAA/NOS/CO-OPS 8772985 Sargent, TX

Barometric Pressure

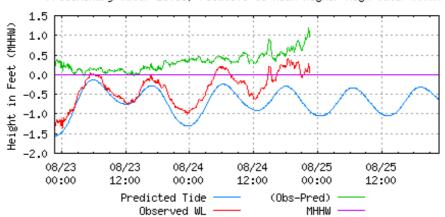


Last Observed Sample: 08/24/2017 22:36 (CDT)

Barometric Pressure: 1008.6 mb

## NOAA/NOS/CO-OPS 8772447 Freeport, TX

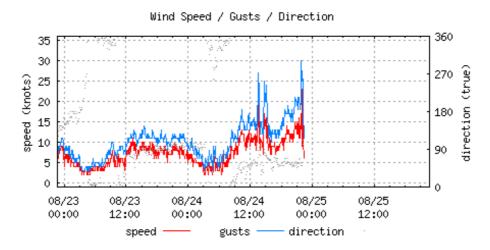
Preliminary Water Level, relative to Mean Higher High Water(MHHW)



Last Observed Sample: 08/24/2017 22:36 (CDT). Data relative to MHHW Observed: -0.01 ft. Predicted: -0.94 ft. Residual: 0.93 ft. Historical Maximum Water Level: Sep 12 2008, 5.58 ft.

Next High Tide: 08/25/2017 06:33 (CDT), -0.33 ft.

### NOAA/NOS/CO-OPS 8772447 Freeport, TX



Last Observed Sample: 08/24/2017 22:36 (CDT) Wind Speed: 11 knots Gusts: 17 knots Direction: 58° T

### NOAA/NOS/CO-OPS 8772447 Freeport, TX

#### Barometric Pressure

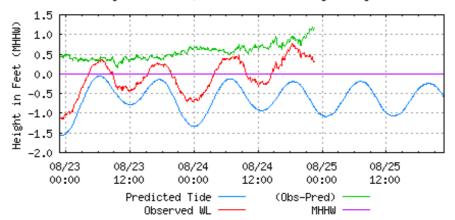


Last Observed Sample: 08/24/2017 22:36 (CDT)

Barometric Pressure: 1010.0 mb

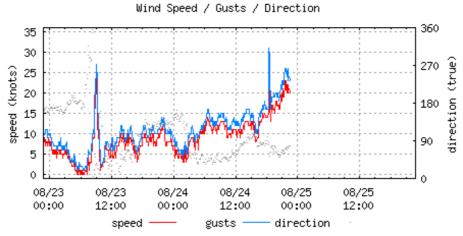
### NOAA/NOS/CO-OPS 8771341 Galveston Bay Entrance, North Jetty, TX

Preliminary Water Level, relative to Mean Higher High Water(MHHW)



Last Observed Sample: 08/24/2017 22:30 (CDT). Data relative to MHHW Observed: 0.32 ft. Predicted: -0.84 ft. Residual: 1.16 ft. Historical Maximum Water Level: Jul 15 2003, 4.08 ft. Next High Tide: 08/25/2017 07:11 (CDT), -0.19 ft.

### NOAA/NOS/CO-OPS 8771341 Galveston Bay Entrance, North Jetty, TX



Last Observed Sample: 08/24/2017 22:30 (CDT) Wind Speed: 20 knots Gusts: 23 knots Direction: 79° T

### NOAA/NOS/CO-OPS 8770822 Texas Point, Sabine Pass, TX

Preliminary Water Level, relative to Mean Higher High Water(MHHW) Height in Feet (MHHW) 1.0 0.5 0.0 -0.5 -1.0 -1.5-2.0 08/23 08/23 08/24 08/24 08/25 08/25 00:00 12:00 12:00 12:00 00:00 00:00 Predicted Tide (Obs-Pred) Observed WL MHHW

Last Observed Sample: 08/24/2017 22:36 (CDT). Data relative to MHHW Observed: -0.07 ft. Predicted: -1.03 ft. Residual: 0.96 ft. Historical Maximum Water Level: Mar 20 2012, 1.91 ft. Next High Tide: 08/25/2017 06:42 (CDT), -0.13 ft.

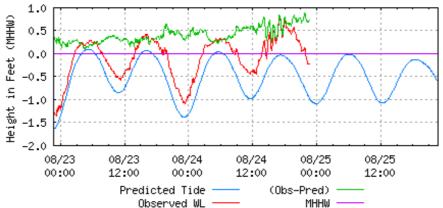
### NOAA/NOS/CO-OPS 8770822 Texas Point, Sabine Pass, TX

Wind Speed / Gusts / Direction 360 35 30 270 direction (true) speed (knots) 25 20 180 15 10 90 5 0 08/23 08/23 08/24 08/24 08/25 08/25 00:00 12:00 00:00 12:00 00:00 12:00 gusts direction

Last Observed Sample: 08/24/2017 22:36 (CDT) Wind Speed: 12 knots Gusts: 17 knots Direction: 58° T

### NOAA/NOS/CO-OPS 8768094 Calcasieu Pass, LA

Preliminary Water Level, relative to Mean Higher High Water(MHHW)

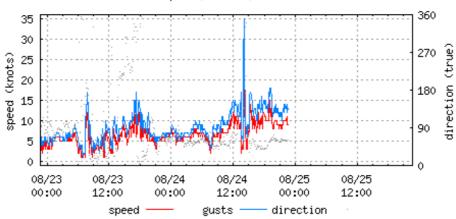


Last Observed Sample: 08/24/2017 22:36 (CDT). Data relative to MHHW Observed: -0.23 ft. Predicted: -0.96 ft. Residual: 0.73 ft. Historical Maximum Water Level: Sep 13 2008, 9.96 ft.

Next High Tide: 08/25/2017 06:00 (CDT), -0.01 ft.

### NOAA/NOS/CO-OPS 8768094 Calcasieu Pass, LA

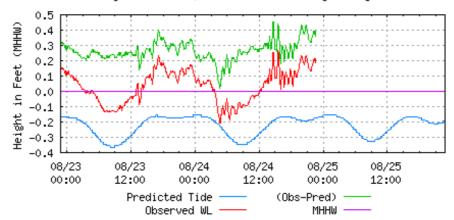
Wind Speed / Gusts / Direction



Last Observed Sample: 08/24/2017 22:36 (CDT) Wind Speed: 9 knots Gusts: 13 knots Direction: 62° T

### NOAA/NOS/CO-OPS 8773037 Seadrift, TX

Preliminary Water Level, relative to Mean Higher High Water(MHHW)

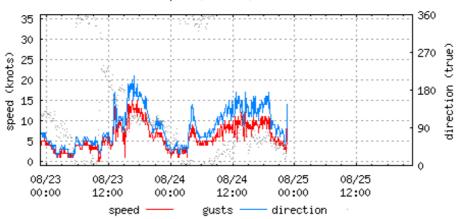


Last Observed Sample: 08/24/2017 22:36 (CDT). Data relative to MHHW Observed: 0.22 ft. Predicted: -0.17 ft. Residual: 0.39 ft.

Historical Maximum Water Level: n/a Next High Tide: 08/25/2017 01:16 (CDT), -0.15 ft.

### NOAA/NOS/CO-OPS 8773037 Seadrift, TX

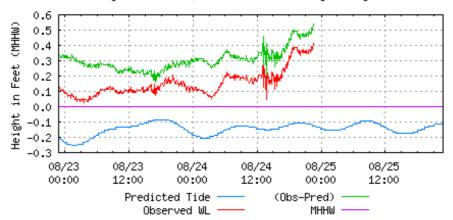
Wind Speed / Gusts / Direction



Last Observed Sample: 08/24/2017 22:36 (CDT) Wind Speed: 10 knots Gusts: 14 knots Direction: 42° T

### NOAA/NOS/CO-OPS 8774770 Rockport, TX

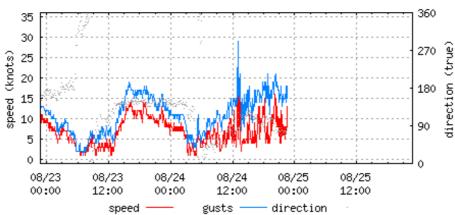
Preliminary Water Level, relative to Mean Higher High Water(MHHW)



Last Observed Sample: 08/24/2017 22:36 (CDT). Data relative to MHHW Observed: 0.42 ft. Predicted: -0.12 ft. Residual: 0.54 ft. Historical Maximum Water Level: Aug 10 1980, 3.73 ft. Next High Tide: 08/25/2017 08:34 (CDT), -0.09 ft.

## NOAA/NOS/CO-OPS 8774770 Rockport, TX

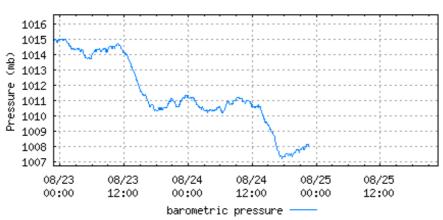
Wind Speed / Gusts / Direction



Last Observed Sample: 08/24/2017 22:36 (CDT) Wind Speed: 13 knots Gusts: 18 knots Direction: 84° T

## NOAA/NOS/CO-OPS 8774770 Rockport, TX

Barometric Pressure

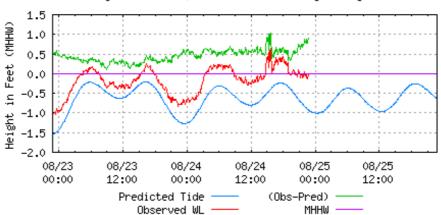


Last Observed Sample: 08/24/2017 22:36 (CDT)

Barometric Pressure: 1008.0 mb

### NOAA/NOS/CO-OPS 8775870 Bob Hall Pier, Corpus Christi, TX

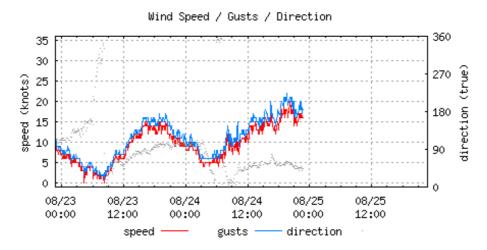
Preliminary Water Level, relative to Mean Higher High Water(MHHW)



Last Observed Sample: 08/24/2017 22:42 (CDT). Data relative to MHHW Observed: -0.02 ft. Predicted: -0.92 ft. Residual: 0.90 ft. Historical Maximum Water Level: Sep 13 2008, 3.98 ft.

Next High Tide: 08/25/2017 06:10 (CDT), -0.37 ft.

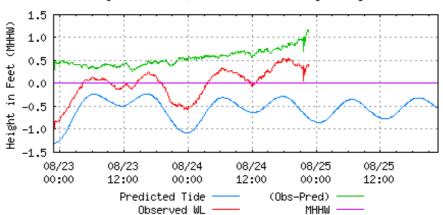
### NOAA/NOS/CO-OPS 8775870 Bob Hall Pier, Corpus Christi, TX



Last Observed Sample: 08/24/2017 22:42 (CDT) Wind Speed: 16 knots Gusts: 18 knots Direction: 43° T

### NOAA/NOS/CO-OPS 8779748 South Padre Island CG Station, TX

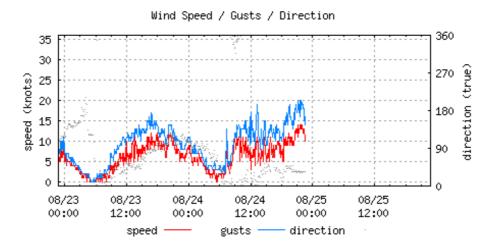
Preliminary Water Level, relative to Mean Higher High Water(MHHW)



Last Observed Sample: 08/24/2017 22:36 (CDT). Data relative to MHHW Observed: 0.37 ft. Predicted: -0.76 ft. Residual: 1.13 ft.

Historical Maximum Water Level: n/a Next High Tide: 08/25/2017 06:40 (CDT), -0.35 ft.

### NOAA/NOS/CO-OPS 8779748 South Padre Island CG Station, TX



Last Observed Sample: 08/24/2017 22:36 (CDT) Wind Speed: 11 knots Gusts: 14 knots Direction: 35° T

Latest Water Level Observations on MHHW

Station II	Station Name	Date/Time	Observed Water Level	Predicted Tide	Residual Water Level	Maximum Storm
8773259	Port Lavaca, TX	08/24/2017 22:42 (CDT)	0.46 ft	-0.23 ft	0.69 ft	<b>Tide</b> 0.48 ft
8773146	Matagorda City, TX	08/24/2017 22:36 (CDT)	0.39 ft	-0.18 ft	0.57 ft	0.58 ft
8772985	Sargent, TX	08/24/2017 22:36 (CDT)	0.32 ft	-0.26 ft	0.58 ft	0.47 ft
8772447	Freeport, TX	08/24/2017 22:36 (CDT)	-0.01 ft	-0.94 ft	0.93 ft	0.40 ft
8771341	Galveston Bay Entrance, North Jetty, TX	08/24/2017 22:30 (CDT)	0.32 ft	-0.84 ft	1.16 ft	0.77 ft
8770822	Texas Point, Sabine Pass, TX	08/24/2017 22:36 (CDT)	-0.07 ft	-1.03 ft	0.96 ft	0.80 ft
8768094	Calcasieu Pass, LA	08/24/2017 22:36 (CDT)	-0.23 ft	-0.96 ft	0.73 ft	0.80 ft
8773037	Seadrift, TX	08/24/2017 22:36 (CDT)	0.22 ft	-0.17 ft	0.39 ft	0.27 ft
8774770	Rockport, TX	08/24/2017 22:36 (CDT)	0.42 ft	-0.12 ft	0.54 ft	0.42 ft
8775870	Bob Hall Pier, Corpus Christi, TX	08/24/2017 22:42 (CDT)	-0.02 ft	-0.92 ft	0.90 ft	0.64 ft
8779748	South Padre Island CG Station, TX	08/24/2017 22:36 (CDT)	0.37 ft	-0.76 ft	1.13 ft	0.55 ft

Center for Operational Oceanographic Products & Services (CO-OPS) | National Ocean Service (NOS) National Oceanic and Atmospheric Administration | U.S. Department of Commerce